Building Databases for Global Dynamics of Multiparameter Systems

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Nonlinear dynamical systems can exhibit complicated behavior occurring on a variety of spatial scales and changing subtly with respect to system parameters. In many applications there are models for dynamics but specific parameters are unknown or not directly measurable. This suggests the need to be able to search through parameter space for specific types of dynamical behavior. Ideally, this would be done computationally in some automated manner, and then later the researcher would be able to query the results. In this talk, we discuss computational topological methods which can extract coarse, but rigorous, global descriptions of dynamics and changes with respect to parameters. Moreover, we discuss ongoing efforts to develop a method for building databases that contain useful, rapidly identifiable information about the types of dynamics computed. This will be an extension of the talk by S. Day.